

**What is claimed is:**

1. A method of manufacturing lower plate barrier ribs for a Plasma Display Panel (PDP) comprising the steps of:

- 5 forming a thick film (or, "green tape") for barrier ribs on a glass or metal substrate by using composition for forming the barrier ribs, which contains water soluble components and solvent soluble components together as a binder;
- forming a protective pattern film partially soluble or insoluble to the water soluble solution on the thick film;
- 10 etching the thick film into a barrier rib shape by using solution or mixed solution containing ceramic powder as an etching accelerator; and
- sintering the etched thick film.

2. A method of manufacturing lower plate barrier ribs for PDP according to claim 1, wherein the method comprises the steps of:

- 15 (1) making a slurry by mixing glass powder and ceramic powder so that a mixing ratio is in the range between 50:50 and 95:5(volume ratio), and then mixing 20 to 40wt% of solvent, 2 to 12wt% of binder including water soluble components and solvent soluble components, 3 to 18wt% of plasticizer and 0.5 to 2wt% of dispersion agent and defoaming agent on the basis of 100wt% of the mixed powder;
- 20 (2) making a thick film by coating the slurry on the glass or metal rear plate in the thickness of 5 to 200 $\mu$ m, and then drying the coated slurry naturally or artificially under a predetermined temperature profile condition;
- (3) forming the etching protective pattern film partially soluble or insoluble to the solution through printing or exposure, development and printing on the thick film formed on the glass or metal substrate;
- 25 (4) etching the thick film on which the protective pattern film is formed into a barrier rib shape by water-spraying the solution or the mixed solution in which the ceramic powder is included

as etching accelerator; and

(5) removing the protective pattern film and then sintering the specimen at 450°C to 600°C for 0.5 to 1 hour.

5           3.       A method of manufacturing lower plate barrier ribs for PDP according to claim 2, wherein the step (2) is executed by:

          making the green tape by coating the slurry on a polymer carrier film in the thickness of 5 to 200 $\mu$ m and then drying the coated slurry naturally or artificially under a predetermined temperature profile condition; and

10           making the thick film for barrier rib by laminating the green tape, formed on the polymer carrier film, on the glass or metal substrate.

          4.       A method of manufacturing rear plate barrier ribs for PDP according to claim 1, wherein 0.5 to 10wt% of surfactant and/or 0.5 to 10wt% of wetting agent is added to the  
15       solution on the basis of water, which is solvent.

          5.       A method of manufacturing rear plate barrier ribs for PDP according to claim 1, wherein the ceramic powder added to the mixed solution has an angled shape and an average particle size of 0.1 to 10 $\mu$ m, and an added amount of the ceramic powder is 0 to 30wt% on  
20       the basis of water, which is solvent.

          6.       Composition for manufacturing barrier ribs for a Plasma Display Panel (PDP) comprising:

          (a) 100wt% of mixture of glass powder and ceramic powder of which a volume ratio is in  
25       the range of 50:50 to 95:5;

          (b) 20 to 40wt% of solvent;

          (c) 2 to 12wt% of binder including water soluble components and solvent soluble components together;

(d) 3 to 18wt% of plasticizer; and

(e) 0.5 to 2wt% of dispersion agent and/or defoaming agent.

7. Composition for manufacturing barrier ribs for PDP according to claim 6,

5 wherein the glass powder has an average particle size of 0.1 to 10 $\mu$ m and is selected from the group consisting of PbO-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>, P<sub>2</sub>O<sub>5</sub>-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> and Bi<sub>2</sub>O<sub>3</sub>-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> or their mixtures;

wherein the ceramic powder has an average particle size of 1 to 10 $\mu$ m and is selected from the group consisting of Al<sub>2</sub>O<sub>3</sub>, fused silica, TiO<sub>2</sub> and ZnO<sub>2</sub>, or their mixture;

10 wherein the solvent is one solution or at least two mixed solution selected from the group consisting of methyl ethyl ketone (MEK), ethyl alcohol, isopropyl alcohol, toluene, xylene, tri-chloro ethylene, butanol, methanol, acetone, cyclohexanol, nitro-propane, propanol, N-propanol and water;

wherein the binder is a mixture of water soluble binder and solvent soluble binder having a volume ratio in the range of 20:1 to 1:20;

15 wherein the plasticizer is selected from the group consisting of diethyl oxalate, polyethylene, polyethylene glycol (PEG), dimethyl phthalate (DMP), dibutyl phthalate (DBP), dioctyl phthalate (DOP), butyl benzyl phthalate, polyalkylene glycols, polypropylene glycol (PPG), tri-ethylene glycol, propylene carbonate, water and butyl stearate, or their mixture; and

20 wherein the dispersion agent is selected from the group consisting of menhaden fish oil, polyethyleneimine, glyceryl trioleate, polyacrylic acid, corn oil, polyisobutylene, linoleic acid, stearic acid, ammonium salt, salt acrylic acid, salt of poly acrylic acids, salt of methacrylic acids, linseed oil, glycerol triolate, sodium silicate, dibutylamine, ethoxylate, phosphate ester and 4,5-dihydroxy-1,3-benzenedisulfonic acid (Tiron).

8. Composition for manufacturing rear plate barrier ribs for PDP according to claim 7,

25 wherein the water soluble binder is selected from the group consisting of polyvinyl alcohol (PVA), hydroxyethyl cellulose (HEC), polyvinyl acetate (PVAc), polyvinyl pyrrolidine (PVP), methyl cellulose (MC), hydroxypropylmethyl cellulose (HPMC), polypropylene carbonate, waxes, emulsion and latex, or their mixture, and has an average molecular weight of 5,000 to 300,000; and

wherein the solvent soluble binder is selected from the group consisting of cellulose, ethyl cellulose (EC), polyvinyl butyral (PVB), polymethyl methacrylate (PMMA), polyacrylate ester, polyvinyl pyrrolidine (PVP), polyvinyl chloride, polyethylene, polytetrafluoroethylene (PTFE), poly- $\alpha$ -methyl styrene, polyisobutylene, polyurethane, nitro-cellulose and methyl methacrylate, or  
5 their mixture, and has an average molecular weight of 5,000 to 300,000.

9. A Plasma Display Panel (PDP) using the barrier ribs manufactured according to the method defined in the claim 1.

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